(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date 1 September 2005 (01.09.2005)

PCT

(10) International Publication Number WO 2005/081016 A1

(51) International Patent Classification7:

G01V 3/12

(21) International Application Number:

PCT/GB2005/000360

- (22) International Filing Date: 3 February 2005 (03.02.2005)
- (25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

0403372.6

16 February 2004 (16.02.2004) GB

- (71) Applicant (for all designated States except US): OHM LIMITED [GB/GB]; The Technology Centre, Offshore Technology Park, Claymore Drive, Bridge of Don, Aberdeen AB23 8GD (GB).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): MACGREGOR, Lucy, M. [GB/GB]; 144/3 Whitehouse Loan, Edinburgh EH9 2AN (GB). ANDREIS, David [FR/FR]; 83 La Cite Haute, F-13170 Les Pennes (FR). TOMPKINS, Michael [US/US]; 1523 Welch Street, Houston, TX 77006 (US).
- (74) Agents: HAINES, Miles, John et al.; D. Young & Co., 120 Holborn, London EC1N 2DY (GB).

- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

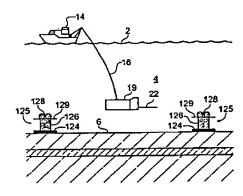
- of inventorship (Rule 4.17(iv)) for US only

Published:

- with international search report

[Continued on next page]

(54) Title: ELECTROMAGNETIC SURVEYING FOR RESISTIVE OR CONDUCTIVE BODIES



(57) Abstract: A method of analysing electromagnetic survey data from an area of seafloor (6) that is thought or known to contain a conductive or resistive body, such as a subterranean hydrocarbon reservoir (12), is described. The method includes providing electric field data and magnetic field data, for example magnetic flux density, obtained by at least one receiver (25) from a horizontal electric dipole (HED) transmitter (22) and determining a vertical gradient in the electric field data. The vertical gradient in the electric field data and the magnetic field data are then combined to generate combined response data. The combined response data is compared with background data specific to the area being surveyed to obtain difference data sensitive to the presence of a subterranean hydrocarbon reservoir. Because the combined response data are relatively insensitive to the transverse electric (TE) mode component of the transmitted signal, the method allows hydrocarbon reservoirs to be detected in shallow water where the TE mode component interacting with the air would otherwise dominate. Furthermore, because there is no mixing between the TE and transverse magnetic (TM) modes in the combined response data, data from all possible transmitter and receiver orientations may be used. The background data may be provided by magneto-telluric surveying, controlled source electromagnetic surveying or from direct geophysical measurement.

AE/001014